

HWRF testing and user support at the Developmental Testbed Center

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The Hurricane Weather Research and Forecast model (Hurricane WRF, or HWRF) is a configuration of the WRF model used operationally by NOAA for providing numerical guidance in tropical cyclone forecasting to the National Hurricane Center. HWRF was developed at the Environmental Modeling Center (EMC) of the NOAA National Centers for Environmental Prediction (NCEP) using the Nonhydrostatic Mesoscale Model (NMM) dynamic core in the WRF infrastructure.

HWRF was implemented in operations in 2007 and since then has undergone significant upgrades geared towards improving the forecast of storm track, intensity, and structure. Since 2009, EMC and the Developmental Testbed Center (DTC) have partnered to test and support HWRF to a broad user community. Initial activities were focused on generalizing the HWRF code, build mechanism and running environment to platforms available outside of NCEP. Fully documented code has been released yearly since 2010 and extensive documentation and user support have been provided.

Keeping the source code used by the research community, by the developers and at NCEP Central Operations synchronized was a major undertaking in the first years of the DTC-EMC collaboration. This challenge was addressed in 2011 with the establishment of the HWRF code management process, which relies on a repository at the DTC, which centralizes the code used by all partners.

The establishment of the code repository, with unified well-tested code and developmental branches, opened the door for extensive diagnostics and testing of new HWRF capabilities at the DTC. These activities are directed towards understanding the models strengths and weaknesses and at transitioning research to operations to address shortcomings.

In this presentation we will give an overview of the hurricane activities in the DTC and present results of an experimental HWRF configuration in which the transfer of momentum flux between the ocean and the atmosphere was altered. This alteration, tested by DTC for the entire 2012 hurricane season in the North Atlantic and Eastern North Pacific basins, led to a statistically significant decrease in the positive intensity bias for North Atlantic storms and is being considered by EMC for the 2013 operational implementations of the HWRF and Geophysical Fluid Dynamics Laboratory (GFDL) models.